



MEĐIMURSKO VELEUČILIŠTE U ČAKOVCU

MEĐIMURJE UNIVERSITY OF APPLIED SCIENCES IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2025/2026

1. GENERAL COURSE INFORMATION

1.1 Course name	Operating systems			
1.2 Study program/s	Professional undergraduate study in Computer Engineering			
1.3 Course status (O,E)	O	1.6 Mode of instruction (number of hours)	Lectures	30
1.4 Course code			Exercises	30
1.5 Course abbreviation			Seminars	
1.6 Semester	IV		E-learning	Merlin
1.7 ECTS	5	1.7 Place and time of instruction	The premises of the Međimurje University of Applied Sciences in Čakovec, according to the schedule published on the website	

2. TEACHING STAFF

2.1 Course leader/s-title	Nenad Breslauer, senior lecturer	contact	nbreslauer1@mev.hr
		contact	
2.2 Assistant/s- title		contact	
		contact	
2.3 Instruction held by- title	Nenad Breslauer, senior lecturer	contact	nbreslauer1@mev.hr

3. COURSE DESCRIPTION

3.1. Course goals	Identify the basic specifics of operating systems. The main thematic units of the course include knowledge in the following areas: (i) definition and role of the operating system, (ii) management of directories and files and reading and writing data, (iii) computer processes and multi-threaded parallel execution of program code, (iv) synchronization mechanisms. The primary goal of the course is to teach students about these four topics and them provide knowledge and skills from the above four thematic groups in order to be able to successfully master the defined learning outcomes.
3.2 Prerequisites	To take the course, it is necessary to pass the course Programming.
3.3 Course outcomes	After successfully completing the course, students will be able to: 11 - Compare and evaluate the elements of the operating system with regard to their development and application in accordance with modern needs. 12 - Generate program code that uses existing system calls. 13 - Generate program code for managing files and directories. 14 - Generate program code to write and read data to the file system. 15 - Compare the computer process and the computer thread and justify the application of one or the other. 16 - Generate process management program code. 17 - Generate code for managing threads. 18 - Compare synchronization mechanisms and justify the use of an individual with regard to the problem.

3.4 Contribution of the course to the study program	Identify the basic specifics of operating systems.																																
3.5 Course content	<p>The course teaches knowledge in the field of file management, where students are explained in general the possibilities of system calls on examples of retrieving data about various parts of the operating system. The system calls for working with the file system, retrieving data related to the file system and the files themselves are displayed. The options for system calls, file management, and writing and reading data are displayed.</p> <p>The following section introduces the concept of a computer process and a computer thread, and shows the system calls of the operating system for working with processes and threads, the display of the list of processes and process data. Examples of starting a tree are explained and the differences and similarities of a tree and a process are analyzed.</p> <p>The last unit provides knowledge and skills related to synchronization mechanisms necessary in the conditions of parallel execution of program code. System calls by which the Monitor, Mutex and Semaphore synchronization mechanisms are realized are processed. The use of synchronization mechanisms on the problem of hungry philosophers, the problem of producers and consumers and other examples.</p>																																
3.6 Types of coursework	X	Lectures	X	Exercises	Blended e-learning	X	Individual activities	Laboratory																									
		Seminars and workshops		Distant learning	Field classes		Multimedia and network	Mentorship																									
		Other																															
3.7 Language of instruction	Croatian																																
3.8 Monitoring students' work (enter the number of ECTS credits for each activity so that the total number of ECTS credits is equal to the total ECTS value of the course, 1 ECTS = 30 hours)	2	Class attendance		Seminars		Research																											
	1.5	Midterm exams/written exam		Project		Essay																											
		Oral exam	1.5	Practical task																													
	<table border="1"> <thead> <tr> <th data-bbox="603 1442 948 1473">Activity specification</th> <th data-bbox="954 1442 1134 1473">Percent %</th> <th data-bbox="1141 1442 1321 1473">Points</th> </tr> </thead> <tbody> <tr> <td colspan="3" data-bbox="603 1473 1321 1505">Assessment during instruction</td> </tr> <tr> <td data-bbox="603 1505 948 1576">1. Intermediate exam (theoretical test)</td> <td data-bbox="954 1505 1134 1576">10%</td> <td data-bbox="1141 1505 1321 1576">20</td> </tr> <tr> <td data-bbox="603 1576 948 1648">1. Intermediate exam (practical exam)</td> <td data-bbox="954 1576 1134 1648">10%</td> <td data-bbox="1141 1576 1321 1648">20</td> </tr> <tr> <td data-bbox="603 1648 948 1720">2. Intermediate exam (theoretical test)</td> <td data-bbox="954 1648 1134 1720">15%</td> <td data-bbox="1141 1648 1321 1720">30</td> </tr> <tr> <td data-bbox="603 1720 948 1792">2. Intermediate exam (practical exam)</td> <td data-bbox="954 1720 1134 1792">15%</td> <td data-bbox="1141 1720 1321 1792">30</td> </tr> <tr> <td data-bbox="603 1792 948 1863">3. Intermediate exam (theoretical test)</td> <td data-bbox="954 1792 1134 1863">20%</td> <td data-bbox="1141 1792 1321 1863">40</td> </tr> <tr> <td data-bbox="603 1863 948 1935">3. Intermediate exam (practical exam)</td> <td data-bbox="954 1863 1134 1935">20%</td> <td data-bbox="1141 1863 1321 1935">40</td> </tr> <tr> <td data-bbox="603 1935 948 1977">Homework</td> <td data-bbox="954 1935 1134 1977">10%</td> <td data-bbox="1141 1935 1321 1977">20</td> </tr> </tbody> </table>						Activity specification	Percent %	Points	Assessment during instruction			1. Intermediate exam (theoretical test)	10%	20	1. Intermediate exam (practical exam)	10%	20	2. Intermediate exam (theoretical test)	15%	30	2. Intermediate exam (practical exam)	15%	30	3. Intermediate exam (theoretical test)	20%	40	3. Intermediate exam (practical exam)	20%	40	Homework	10%	20
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<p>3.9 Specific features related to taking the course</p>	<p>The course has 8 defined learning outcomes. A maximum of 200 points can be earned. Learning outcomes are scored and checked through the following methods:</p> <ul style="list-style-type: none"> ● First intermediate exam (M1): up to 40 points, of which 20 are achieved by a theoretical test and 20 by practical work. ● Second intermediate exam (M2): up to 60 points, of which 30 are achieved by a theoretical test and 30 by practical work. ● Third intermediate exam (M3): up to 80 points, of which 40 are achieved by a theoretical test and 40 by practical work. ● Homeworks through semester: 20 points. <p>To pass the course based on continuous assessment, the student must achieve at least 50% of the total possible points in the theoretical part of the exam (45 points) and 50% of the total possible points in the practical part of the exam (45 points).</p> <p>Through additional work and commitment through homework and designing and creating their own projects during the semester, the student can earn an additional amount of points. All these activities must be agreed in advance with the lecturers on the course, and all such papers and projects must be designed, developed and submitted for evaluation by the end of the 14th week of classes in the semester.</p> <p>The final criterion for calculating the grade will be created based on the Normal distribution of the total points achieved by all students in the intermediate exams M1, M2 and M3. If the newly created criterion based on the Normal distribution is less favorable for students, they will apply the Initial criterion.</p> <p>Students who do not achieve 100 or more points during the semester are required to take an exam that evaluates all learning outcomes defined in the course. The student must achieve at least 50% points on each of the learning outcomes.</p> <p>The exam is conducted in the following ways:</p> <ul style="list-style-type: none"> ● Solving a test on a computer within the e-learning system (Moodle / Loomen). ● Creating a software solution on a computer based on assigned tasks. ● Talk to the student about the software solution. 												
<p>3.10 Students obligations</p>	<ul style="list-style-type: none"> ● Full-time students are required to attend at least 70% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. 												

	<ul style="list-style-type: none"> Part-time students are required to attend at least 30% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. If the student has not fulfilled all the obligations set by the course, he is obliged to attend the lectures again and meet the conditions for taking the exam. Attendance can be offset by added assignments given by teachers. One lesson lasts 45 minutes, and several hours form a teaching unit. Absence from one teaching unit is counted as one absence. Delays and apologies are recorded separately. In that case, if the student missed more than 50% of classes, and has a justifiable reason/apology, the request should be submitted to the Department Council, which then decides on the justification of student absences with the obligatory opinion of the course leader.
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3.11 Written assignments	
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3.12 Required reading	1.	Budin, Golub, Jakobović, Jelenković, Operating Systems, Element, Zagreb, 2011
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3.13 Additional reading	1.	Tanenbaum, Modern operating systems, 3rd ed, Prentice hall, 2007.
	2.	Silberschatz, S. Galvin, Operating System Concepts, Addison Wesley Publishing Company, Reading, Mass., 8th ed, 2008.
	3.	W. Kort: Programming in C #, Exam Ref 70-483, Microsoft Press
	4.	Lecture content for the course (PPT presentations) available on the Loomen system

4. ADDITIONAL INFORMATION ABOUT THE COURSE

4.1 Quality control	The quality of the program, teaching process, teaching skills and level of mastery of the material will be established by conducting a written evaluation based on questionnaires, and in other standardised ways and in accordance with the by-laws of the Međimurje University of Applied Sciences in Čakovec.
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4.2 Contact the teacher	Students can contact the teacher during the office hours and during classes. All other methods of communication are arranged with the teacher. It is also possible to ask questions by e-mail, which will be answered in 48 hours at the latest. It is desirable for students to come as often as possible for any possible questions during the teacher's office hours.
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4.3 Information about the course	It is the obligation of each student to be regularly informed about the course. All notifications about the classes or possible postponement of classes will be posted on the bulletin board and on the website of the University at least 24 hours in advance.
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5. ELABORATION OF THEMATIC UNITS

Week	Topic	Course outcome
1.	Operating System Development	I1
2.	Definition of Operating Systems	I2
3.	Computer Boot Process	I2
4.	Operating System Kernel	I2
5.	Data Organization within File Systems	I2, I3
6.	File Management	I2, I3, I4
7.	Computer Process	I5, I6
8.	Process Life Cycle	I5, I6
9.	Threads	I5, I7
10.	Multithreading	I5, I7
11.	Working with Threads within the User Interface	I7

12.	Thread Mutual Exclusion	15-18
13.	Synchronization Mechanisms	15-18
14.	Producer-Consumer Problem	15-18
15.	Virtual Memory	15-18